



Author Name: Annie Larson	Content Areas: Science
Lesson Plan Title: Crocodiles and Conservation	State: CA
Lesson Time Frame: 2 weeks	Inspired by an Earthwatch Expedition: Crocodiles of Cuba
Student Level: Middle School	

In order to establish the foundation of the scientific method in my classroom, I begin each year with a unit on "Helpful Scientists". Within this unit, my classroom examines a current issue in science or our community and highlights ways in which we can be proactive in using scientific study to develop solutions. This year, my students will learn the concepts of scientific method, variables, measurement and internet research skills within the context of American crocodile conservation in the mangrove swamps of Cuba. Using the research skills and techniques that I used in the mangrove swamps, my students will measure and analyze "crocodile nests" in our classroom according to given scenarios regarding nest size, egg size, proximity to water, etc. The students will identify dependent and independent variables and complete formal lab write-ups individually. Then, in groups of four, the students will present their findings in formal presentations. They will also be able to speak on conservation movements and crocodile habitats in the area from internet research elements of the unit. This unit is aligned with the California Science Investigation and Experimentation Standards for middle school students.

Unit Title	"Helpful Scientists" Conservation Unit
Grade Level	7 th and 8 th
Content Area	Science
Time Allotment	Two weeks
Academic Standards	Standard Set 9. Investigation and Experimentation 9a. Plan and conduct a scientific investigation to test a hypothesis 9b. Evaluate the accuracy and reproducibility of data 9c. Distinguish between variable and controlled parameters in a test 9e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables
Abstract	I will first introduce the students to my research efforts in Cuba through an interactive slide presentation. The students will then design and perform a scientific investigation of a given "crocodile" nest using scenarios, simulated nest conditions and measurement tools such as rulers, balances, graduated cylinders and meter sticks. Next, the students will research the American crocodile habitat and conservation efforts in Cuba, finally presenting their findings in formal presentations including

	visual aids, note cards and experimental data.
Goal	To establish a meaningful connection between scientific discovery and conservational solutions for our communities. To use relevant, hands-on science instruction to teach the concepts of the scientific method, variables, measurement, internet research skills and formal lab write-ups and presentations.
Performance Indicators	The students will be able to perform basic measurements within the context of the evaluation of crocodile nest conditions. The students will be able to identify dependent and independent variables of the investigation. The students will be able to design and state the purpose, hypothesis, materials, procedure, observations and references of their lab investigations. The students will be able to analyze the conditions of their nests and formulate conclusions about the viability of the crocodile hatchlings. The students will be able to use at least two internet sites to research and support, using their own words, their investigation findings. The students will be able to present their findings in a formal lab write-up and presentation including supplemental research and visual aids.
Background Information	The students need to know how to use basic measurement tools such as a ruler, balance, meter stick and graduated cylinder. Also, the students need to know how to identify the variables of an experiment. The students need to know how to perform basic internet research. Finally, the students need to know how to complete a lab write-up including all seven elements of the scientific method.
Materials	LCD projector, computer lab (internet), rulers, meter sticks, electronic balances, graduated cylinders, eggs, nest scenarios, pens, paper, poster board, markers, student notebooks
Technology	LCD projector, Microsoft Power Point, internet access for research
Instructional Procedure	<p>INTO:</p> <ol style="list-style-type: none"> 1. Students discuss, in small groups, previous knowledge about endangered species and what it means to conserve. 2. Power Point presentation about my research in Cuba, including the excavation of crocodile and iguana nests, night spotlight counts and the measurement of iguana and crocodile organisms and iguana embryos. 3. Presentation of unit final project with rubric: formal lab write-up and group presentation. 4. Examination of soft-shelled iguana eggs and crocodile scales. Students write initial observations in their lab notebooks. <p>ACTIVITIES:</p> <ol style="list-style-type: none"> 1. Students receive and analyze nest scenarios according to proximity to water, nest size, egg size and viability and conditions of local habitat. 2. Students "excavate" nests and take measurements of the eggs using rulers (length and width), balances (mass) and graduated cylinders (density). 3. Students design lab investigations including purpose, materials, hypothesis, procedure and references about the conservation of the local American crocodile nests. 4. Students draw conclusions about nest viability and nesting conditions of given scenarios. 5. Students use internet access to research at least two sites about crocodile conservation and habitats to support their lab

	<p>investigations. Students are required to complete a typed page of information to be presented as part of their final group report.</p> <ol style="list-style-type: none"> 6. Students create final lab reports including all seven elements of the scientific method individually. 7. Students use a visual aid and note cards to give four-six minute presentations on their findings. Students must assume the roles of Conservation Expert (presents the crocodile and conservation internet research), Researchers (present the scientific investigation) and Visual Expert (presents the visual aid and describes it). Students are required to take notes on colleagues' presentations. <p>CLOSURE:</p> <ol style="list-style-type: none"> 1. Students complete a reflection proposal about another aspect of conservational research to be explored in our classroom. 2. Students present, in small groups, one conservation-oriented community action plan to be implemented throughout the year. Ideas include recycling programs, a community garden, a community mural, pollution awareness program, etc. 3. Students write a persuasive letter (in English class) about the importance of conservational and environmental efforts in our communities.
Assessment	See attached rubric
Connection to other content areas	Social Studies, English, Leadership
Extensions	The students would benefit from other examples of conservational research throughout the world, especially in Central America as most of my students are of Central American origin. Furthermore, connections between science and the community would continue to present relevant and challenging learning opportunities.
Acknowledgements	
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Crocodiles of Cuba

PRESENTATION RUBRIC

<i>Content</i>	5	3	1
Conservation Expert	<ul style="list-style-type: none"> Excellent, original facts about crocodiles and conservation 	<ul style="list-style-type: none"> Good, basic facts about crocodiles and conservation 	<ul style="list-style-type: none"> Few or no facts about crocodiles and conservation
Researcher 1	<ul style="list-style-type: none"> Excellent, original explanation of purpose, materials and observations 	<ul style="list-style-type: none"> Good, basic explanation of purpose, materials and observations 	<ul style="list-style-type: none"> Little or no explanation of purpose, materials and observations
Researcher 2	<ul style="list-style-type: none"> Excellent, original explanation of hypothesis, procedure and conclusions 	<ul style="list-style-type: none"> Good, basic explanation of hypothesis, procedure and conclusions 	<ul style="list-style-type: none"> Little or no explanation of hypothesis, procedure and conclusions
Visuals	<ul style="list-style-type: none"> Excellent, original explanation of visual aid 	<ul style="list-style-type: none"> Good, basic explanation of visual aid 	<ul style="list-style-type: none"> Little or no explanation of visual aid
<i>Delivery</i>	5	3	1
Note Cards	<ul style="list-style-type: none"> Organized, excellent, at least 3 each 	<ul style="list-style-type: none"> Good, at least 1 each 	<ul style="list-style-type: none"> No note cards
Visual Aid	<ul style="list-style-type: none"> Organized, creative 	<ul style="list-style-type: none"> Organized, basic 	<ul style="list-style-type: none"> Messy or no visual aid
Organization	<ul style="list-style-type: none"> ALL group members talk for equal amounts of time, smooth transitions 	<ul style="list-style-type: none"> ALL group members talk but time is not equal 	<ul style="list-style-type: none"> One or more group members does not contribute
Time Limit	<ul style="list-style-type: none"> Presentation is between 4-6 minutes 	<ul style="list-style-type: none"> Presentation goes over or under by 1 min 	<ul style="list-style-type: none"> Presentation is too long or too short

TOTAL SCORE: _____ / 40 POSSIBLE POINTS

LAB REPORT RUBRIC

<i>Content</i>	5	3	1
Purpose	<ul style="list-style-type: none"> • Clear, relevant, demonstrates critical thinking skills 	<ul style="list-style-type: none"> • Clear, relevant, 	<ul style="list-style-type: none"> • NOT clear or relevant
Hypothesis	<ul style="list-style-type: none"> • Realistic, demonstrates critical thinking skills, "IF...THEN..." 	<ul style="list-style-type: none"> • Realistic, "IF...THEN..." 	<ul style="list-style-type: none"> • NOT realistic, no "IF...THEN"
Materials	<ul style="list-style-type: none"> • Listed with quantities 	<ul style="list-style-type: none"> • Listed 	<ul style="list-style-type: none"> • NOT listed
Procedure	<ul style="list-style-type: none"> • Specific, organized, written in paragraph form 	<ul style="list-style-type: none"> • Specific, written in paragraph form 	<ul style="list-style-type: none"> • Disorganized, not written in paragraph form
Observations	<ul style="list-style-type: none"> • Organized as a table, graph AND diagram, identifies variables 	<ul style="list-style-type: none"> • Organized as a table, graph or diagram, identifies variables 	<ul style="list-style-type: none"> • Disorganized, no variables
Conclusions	<ul style="list-style-type: none"> • Demonstrates critical thinking skills, references hypothesis and observations, identifies ERROR 	<ul style="list-style-type: none"> • References hypothesis and observations, identifies ERROR 	<ul style="list-style-type: none"> • Obvious or no conclusions
References	<ul style="list-style-type: none"> • At least two sources, correctly written 	<ul style="list-style-type: none"> • At least two sources 	<ul style="list-style-type: none"> • One or zero sources
<i>Organization</i>	5	3	1
Organization	<ul style="list-style-type: none"> • ALL parts of the lab • typed or neat handwriting • Cover page with picture • All members contribute to at least TWO SECTIONS EACH 	<ul style="list-style-type: none"> • ALL parts of the lab • Cover page • All members contribute 	<ul style="list-style-type: none"> • At least one part of the lab is missing • Messy • Some members did not contribute

TOTAL SCORE: _____ / 40 POSSIBLE POINTS